

UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 7,261,863 B2
APPLICATION NO. : 09/778192
DATED : August 28, 2007
INVENTOR(S) : Adams et al.

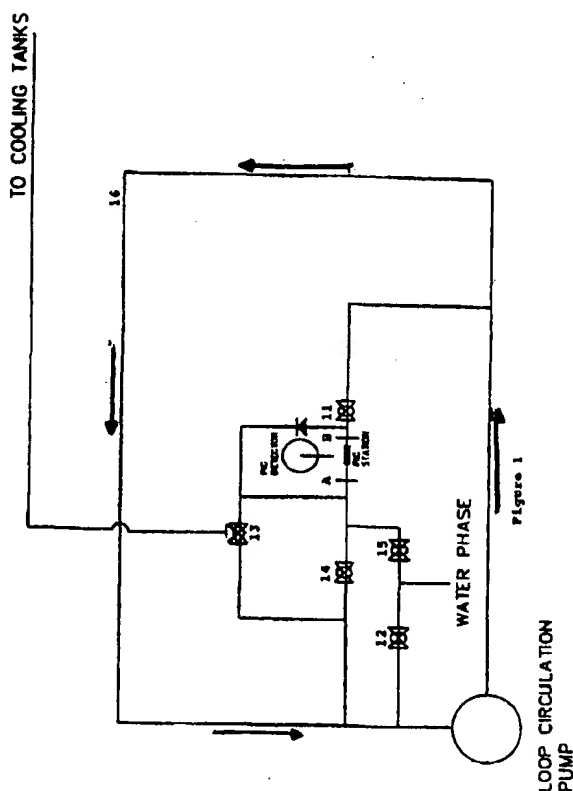
3
Page 1 of 1

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Delete the title page and substitute therefore the attached title page consisting of corrected, illustrative figure

Drawings:

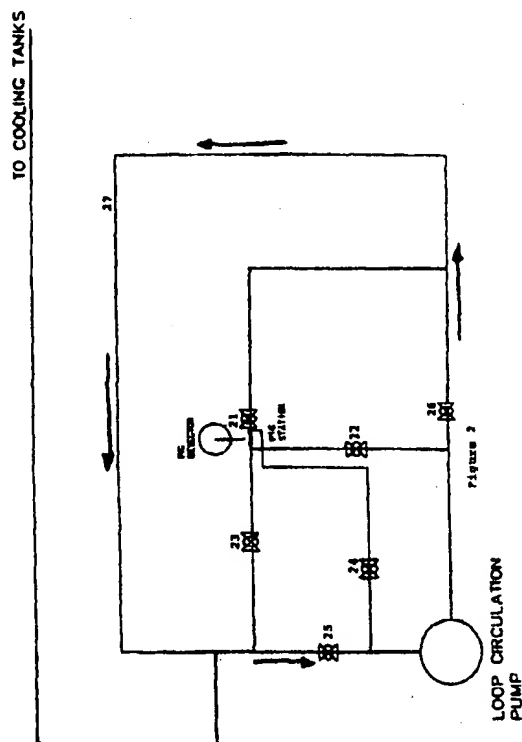
Sheet 1 of 2, the direction of the arrow should be reversed as shown on the Certificate of Correction.



Note This certificate supersedes Certificate of Correction issued July 6, 2010.

[REDACTED]

Sheet 2 of 2, the direction of the arrow should be reversed as shown on the Certificate of Correction.





US007261863B2

(12) **United States Patent**
Adams et al.

(10) **Patent No.:** **US 7,261,863 B2**
 (45) **Date of Patent:** **Aug. 28, 2007**

(54) **CLOSED LOOP CONTINUOUS
 POLYMERIZATION REACTOR AND
 POLYMERIZATION PROCESS**

(75) **Inventors:** **David Charles Adams**, Lancashire
 (GB); **Howard Jones**, Lancashire (GB);
Kenneth Raymond Geddes, Lancashire
 (GB)

(73) **Assignee:** **Akzo Nobel NV**, Arnhem (NL)

(*) **Notice:** Subject to any disclaimer, the term of this
 patent is extended or adjusted under 35
 U.S.C. 154(b) by 0 days.

(21) **Appl. No.:** **09/778,192**

(22) **Filed:** **Feb. 7, 2001**

(65) **Prior Publication Data**

US 2001/0022951 A1 Sep. 20, 2001

Related U.S. Application Data

(63) Continuation of application No. PCT/EP99/04923,
 filed on Jul. 8, 1999.

(30) **Foreign Application Priority Data**

Aug. 7, 1998 (EP) 98202666

(51) **Int. Cl.**

B01J 19/18 (2006.01)

B08B 9/053 (2006.01)

(52) **U.S. Cl.** 422/132; 422/135; 15/104.061

(58) **Field of Classification Search** 422/131,
 422/132, 134, 135, 137, 190, 210, 211, 214;
 526/64; 15/3.5, 3.51

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,220,432 A * 11/1965 Allen 137/268

3,425,083 A 2/1969 Wennerberg et al. 15/104.06
 3,428,489 A * 2/1969 Gentry, Jr. 134/8
 3,547,142 A * 12/1970 Webb 137/268
 3,595,846 A * 7/1971 Rouzier 526/64
 3,682,186 A 8/1972 Howe 137/1
 5,242,827 A * 9/1993 Chaumont et al. 435/292.1

FOREIGN PATENT DOCUMENTS

DE 32 33 557 3/1984
 EP 0 633061 1/1995

OTHER PUBLICATIONS

Maurice Wilkinson and Ken Geddes, "An Award Winning Process",
 Chemistry in Britain, Dec. 1993, pp. 1050-1053.

* cited by examiner

Primary Examiner—Gleann Caldarola

Assistant Examiner—Jennifer A. Leung

(74) *Attorney, Agent, or Firm*—David H. Vickrey; Michelle
 J. Burke

(57) **ABSTRACT**

A closed loop continuous emulsion polymerization apparatus at least comprising a circulation pump, a reactor tube which connects the outlet of the circulation pump to its inlet, at least one feed for supplying raw materials, an outlet, and means for cooling the tube, characterized in that the reactor further comprises an additional tube for by-passing a pig around the circulation pump, a pig receiving station which is in parallel connection with the circulation pump or the reactor tube, and optionally means for directing a pig into the pig receiving station. The invention allows simple removal of the pig from the reactor, affords great freedom in selecting the type of circulation pump and material and shape of the pig, and enables total control over the launching of the pig substantially independent of the reaction medium flow.

18 Claims, 2 Drawing Sheets

